# Pulsars

## SCRIPT:

When we first invented radio telescopes, we discovered little blinking lights were coming from outer space. At first, we thought aliens were sending us a message. Well, they weren't aliens, but something else just as strange.

Imagine an object drifting through space that looks like a gigantic steel ball, ten miles across. It's blinking because it's spinning around like a lighthouse, with searchlights shining from either end. And some of them are spinning a thousand times a second. They're called "pulsars," or "neutron stars." And now we know what they are.

They're the tombs of old stars. Old stars that burn up and die are locked inside these spinning balls. The process begins when the dying star explodes. Then, with gravity that's unbelievable, the star is crushed into a ball of neutrons. That means all the atoms of the star are crushed together to make one giant atom – a single atom 10 miles across – spinning in space. How strange is that..?

That's like taking the biggest mountain on Earth and crushing it inside a golf ball. Mount Everest…crushed inside a tomb the size of a golf ball.

And yet neutron stars, the tombs of ancient stars, are real... one of the wonders of a Universe in which even more fantastic discoveries are surely yet to come.

**NOTE:** There are other fates for burned-out stars besides pulsars. Small to medium-sized stars (the Sun is medium size) turn into black or white "dwarfs." Only bigger stars that have more gravity are crushed into pulsars, or even "black holes."

## Relevant NSES Standards

NSES Content Standard A: Understanding about scientific inquiry.
- (Grades K-4) Classifying objects is a type of investigation.
- (Grades 5-8) Developing models to aid scientific investigation.
- (Grades 9-12) Conceptual principals guide scientific inquiry.

NSES Content Standard B: Physical science.
- (Grades K-4) Properties of objects and materials.
- (Grades 5-8) Properties and changes of properties in matter.
- (Grades 9-12) Structures of atoms.

NSES Content Standard D: Earth and space science.
- (Grades K-4) Objects in the sky. Stars.
- (Grades 9-12) Origin and evolution of the universe.

NSES Content Standard E: Understanding about science and technology.
- (Grades K-4) Science helps explain questions about the natural world.
- (Grades 9-12) Creativity and imagination are required in the work of science.

NSES Content Standard G: History and nature of science.
- (Grades K-4) Men / women make contributions to science (Pulsars discovered by woman)
- (Grades 5-8) Scientists formulate explanations using observation.
- (Grades 9-12) Scientists must always follow the rules of evidence.

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